

CLAIMS

What is claimed is:

1. A wireless hearing aid capable of communicating with a mobile station, the
5 wireless hearing aid comprising:
a short-range wireless transceiver to transmit signals to and receive signals
from the mobile station;
a microphone operatively coupled to an input of the short-range wireless
transceiver to convey input audio signals from a user to the short-
10 range wireless transceiver;
a speaker coupled to an output of the short-range wireless transceiver to
project output audio signals received at the short-range wireless
transceiver to the user; and
interference suppression circuitry operatively connected to the microphone
15 and the short-range wireless transceiver to suppress interference
signals from the input audio signals.
2. The wireless hearing aid of claim 1 wherein said interference suppression
circuitry comprises noise suppression circuitry.
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3. The wireless hearing aid of claim 1 wherein said interference suppression
circuitry comprises acoustic echo suppression circuitry.
4. The wireless hearing aid of claim 1 wherein said interference suppression
25 circuitry comprise acoustic echo suppression and noise suppression circuitry.

5. The wireless hearing aid of claim 1 further comprising switching circuitry to operatively connect the speaker and the microphone to the short-range wireless transceiver in a first mode and to operatively disconnect the speaker and the microphone from the short-range wireless transceiver in a second mode.

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6. The wireless hearing aid of claim 5 wherein said interference suppression circuitry is operatively connected between the microphone and the short-range wireless transceiver when the switching circuitry is in the first mode.

10 7. The wireless hearing aid of claim 1 further comprising audio processing circuitry operatively connected between the short-range wireless transceiver and the speaker to process signals received by the short-range wireless transceiver.

8. The wireless hearing aid of claim 7 wherein the audio processing circuitry
15 includes at least one of an equalizer, a limiter, and an automatic level control.

9. The wireless hearing aid of claim 1 further comprising a controller operatively connected to the short-range wireless transceiver to negotiate one or more short-range wireless network profiles with the mobile station.

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10. The wireless hearing aid of claim 9 wherein the controller further configures audio processing parameters for the interference suppression circuitry while negotiating the one or more short-range wireless network profiles.

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11. A local wireless device compatible with a mobile station, the local wireless device comprising:

a short-range wireless transceiver to communicate information signals with the mobile station via a short-range wireless network;

5 a speaker operatively connected to an output of the short-range wireless transceiver to project output audio signals received at the short-range wireless transceiver to a user;

a microphone system operatively connected to an input of the short-range wireless transceiver to convey input audio signals to the short-range wireless transceiver; and

10 an acoustic echo suppressor operatively connected between the microphone system and the short-range wireless transceiver to suppress acoustic echo signals from the input audio signals.

15 12. The local wireless device of claim 11 wherein the microphone system comprises a microphone operatively connected to the input of the short-range wireless transceiver.

13. The local wireless device of claim 11 wherein the microphone system comprises a plurality of microphones operatively connected to a microphone processor that combines signals from the plurality of microphones into a combined input audio signal.

14. The local wireless device of claim 11 further comprising audio processing circuitry operatively connected between the speaker and the short-range wireless transceiver to process audio signals received by the short-range wireless transceiver.

15. The local wireless device of claim 14 wherein the audio processing circuitry includes at least one of an equalizer, a limiter, and an automatic level control.

16. The local wireless device of claim 11 further comprising a hearing aid processor operatively connected between the speaker and at least one microphone in the microphone system for providing hearing aid functionality in the local wireless device.

17. The local wireless device of claim 16 further comprising switching circuitry to operatively connect the speaker and the microphone system to the short-range wireless transceiver in a communication mode and to operatively disconnect the speaker and the at least one microphone from the short-range wireless transceiver in a hearing aid mode.

18. The local wireless device of claim 11 further comprising a controller operatively connected to the short-range wireless transceiver to negotiate one or more short-range wireless network profiles with the mobile station.

19. The local wireless device of claim 18 wherein the controller negotiates the one or more short-range wireless network profiles for push-to-talk operations when the mobile station employs a voice over Internet protocol.

20. The local wireless device of claim 11 wherein the local wireless device comprises a wireless headset.

21. A mobile station compatible with a local wireless device in a short-range wireless ad hoc network, the mobile station comprising:

a wireless network transceiver to communicate information signals with a far-end user;

5 a short-range wireless transceiver selectively connectable to the wireless network transceiver to communicate the information signals with the local wireless device;

a microphone to receive input audio signals from a near-end user;

interference suppression circuitry operatively connected to the microphone;

10 and

a first switching circuit to selectively connect the wireless network transceiver

to a first audio path in a first mode or to a second audio path in a

second mode, wherein the first audio path includes said ISC and

operatively connects the microphone to the wireless network

15 transceiver, and wherein the second audio path bypasses at least part

of said interference suppression circuitry and operatively connects an

output of the short-range wireless transceiver to the wireless

transceiver.

20 22. The mobile station of claim 21 wherein the interference suppression circuitry comprises noise suppression circuitry.

23. The mobile station of claim 21 wherein the interference suppression circuitry comprises acoustic echo suppression circuitry.

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24. The mobile station of claim 21 wherein the interference suppression circuitry comprises noise suppression and acoustic echo suppression circuitry.

25. The mobile station of claim 21 wherein the first switching circuit connects to the second audio path when the mobile station receives the information signals from the local wireless device via the short-range wireless network.

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26. The mobile station of claim 21 wherein the first switching circuit connects to the first audio path when the mobile station receives acoustic signals from a user via the microphone.

10 27. The mobile station of claim 21 further comprising a speaker to project audio signals to the user.

28. The mobile station of claim 27 further comprising a third audio path operatively connecting the wireless network transceiver to the speaker, and a fourth
15 audio path operatively connecting the wireless network transceiver to an input of the short-range wireless transceiver.

29. The mobile station of claim 28 wherein the third audio path includes an audio signal processor.

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30. The mobile station of claim 29 wherein the output audio signal processor includes at least one of an equalizer, a limiter, and an automatic level control.

31. The mobile station of claim 28 further comprising a second switching circuit to
25 selectively connect the wireless network transceiver to the third audio path in the first mode or to the fourth audio path in the second mode.

32. The mobile station of claim 31 wherein the second switching circuit selectively connects to the third audio path when the mobile station transmits information signals received at the wireless network transceiver to the user via the speaker.

5 33. The mobile station of claim 31 wherein the second switching circuit selectively connects to the fourth path when the mobile station transmits the information signals received at the wireless network transceiver to the local wireless device via the short-range wireless network.

10 34. The mobile station of claim 21 further comprising a controller operatively connected to the short-range wireless transceiver to negotiate one or more short-range wireless network profiles with the local wireless device.

35. The mobile station of claim 34 wherein the second audio path bypasses at
15 least part of said interference suppression circuitry based on the one or more negotiated short-range wireless network profiles.

36. The mobile station of claim 34 wherein the controller negotiates one or more first short-range wireless network profiles for a first local wireless device and further
20 negotiates one or more second short-range wireless network profiles for a second local wireless device.

37. The mobile station of claim 34 wherein the controller further negotiates one or more audio processing parameters.

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38. A local wireless device compatible with a mobile station, the local wireless device comprising:

a short-range wireless transceiver to communicate information signals with the mobile station via a short-range wireless network;

5 a speaker operatively connected to an output of the short-range wireless transceiver to project output audio signals to a user;

at least one microphone operatively connected to an input of the short-range wireless transceiver to convey input audio signals from the user to the short-range wireless transceiver; and

10 interference suppression circuitry operatively connected between the at least one microphone and the short-range wireless transceiver to suppress interference signals from the input audio signals, wherein a controller coupled to said short-range wireless transceiver negotiates with the mobile station to determine properties of said interference suppression circuitry.

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39. The local wireless device of claim 38 wherein the controller determines that the interference suppression circuitry comprises noise suppression circuitry based on the negotiations.

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40. The local wireless device of claim 38 wherein the controller determines that the interference suppression circuitry comprises acoustic echo suppression circuitry based on the negotiations.

25 41. The local wireless device of claim 38 wherein the controller determines that the interference suppression circuitry comprises acoustic echo suppression and noise suppression circuitry based on the negotiations.

42. The local wireless device of claim 38 wherein the at least one microphone comprises a microphone array.

43. The local wireless device of claim 38 further comprising audio processing
5 circuitry operatively connected between the speaker and the short-range wireless transceiver to process signals received by the short-range wireless transceiver.

44. The local wireless device of claim 43 wherein the audio processing circuitry includes at least one of an equalizer, a limiter, and an automatic level control.

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45. The local wireless device of claim 38 further comprising a controller operatively connected to the short-range wireless transceiver to negotiate one or more profiles of the short-range wireless network with the mobile station.

15 46. The local wireless device of claim 38 wherein the local wireless device comprises a wireless headset.

47. A method of establishing a short-range wireless network connection between a local wireless device and a mobile station, the method comprising:

initiating said short-range wireless network connection;

negotiating properties of one or more interference suppression circuits

5 disposed within at least one of the local wireless device and the mobile station;

establishing the short-range wireless network connection; and

configuring the short-range wireless network connection based on the

negotiated properties of the one or more interference suppression

10 circuits.

48. The method of claim 47 wherein initiating said short-range wireless network connection comprises paging the local wireless device with the mobile station.

15 49. The method of claim 47 wherein initiating said short-range wireless network connection comprises paging the mobile station with the local wireless device.

50. The method of claim 47 wherein configuring the short-range wireless network connection comprises activating at least one of said interference suppression circuits
20 in the local wireless device based on the negotiated properties of the one or more interference suppression circuits.

51. The method of claim 50 wherein activating at least one of said interference suppression circuits in the local wireless device comprises activating acoustic echo
25 suppression circuitry in the local wireless device.

52. The method of claim 50 wherein activating at least one of said interference suppression circuits in the local wireless device comprises activating noise suppression circuitry in the local wireless device.

5 53. The method of claim 50 wherein activating at least one of said interference suppression circuits in the local wireless device comprises activating acoustic echo suppression and noise suppression circuitry in the local wireless device.

54. The method of claim 50 wherein activating at least one of said interference suppression circuits in the local wireless device further comprises bypassing the at
10 least one of said interference suppression circuits in the mobile station.

55. The method of claim 54 wherein bypassing the at least one of the interference suppression circuits in the mobile station comprises activating a switch in a mobile
15 station to bypass the at least one of the interference suppression circuits in the mobile station and to operatively connect the short-range wireless transceiver to a wireless network transceiver in said mobile station.

56. The method of claim 47 further comprising negotiating properties of one or
20 more audio processing circuits disposed within at least one of the local wireless device and the mobile station.

57. The method of claim 56 wherein configuring the short-range wireless network connection comprises activating at least one of an equalizer, a limiter, and an
25 automatic level control in at least one of the local wireless device and the mobile station based on the negotiated properties of the audio processing circuits.

58. The method of claim 57 wherein activating at least one of the equalizer, limiter, and automatic level control in said local wireless device comprises activating a switch in said local wireless device to operatively connect at least one of the equalizer, limiter, and automatic level control between the short-range wireless transceiver and a speaker in said local wireless device.

59. The method of claim 57 wherein activating at least one of the equalizer, limiter, and automatic level control in said mobile station comprises activating a switch in the mobile station to operatively connect at least one of said equalizer, limiter, and automatic level control between the short-range wireless transceiver and a speaker in the mobile station.

60. The method of claim 47 wherein initiating the short-range wireless network connection comprises initiating a voice command at the local wireless device.

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61. The method of claim 47 further comprising negotiating one or more short-range wireless network profiles for push-to-talk operations.

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